# Proposal Reviews

## #225: Understanding and Characterizing Sources of Biological Oxygen Demand in West-Side Tributaries of the San Joaquin River

US DOE, Berkeley National Laboratory

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|---|---|
| **Initial Selection Panel Review** | |
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| **Environmental Compliance** | |
| **Budget** | |

# Initial Selection Panel Review:

**CALFED Bay-Delta 2002 ERP PSP**
**Initial Selection Panel Review**

**Proposal Number:** 225

**Applicant Organization:** US DOE, Berkeley National Laboratory

**Proposal Title:** Understanding and Characterizing Sources of Biological Oxygen Demand in West-Side Tributaries of the San Joaquin River

Please provide an overall evaluation rating.

**Explanation of Recommendation Categories: Fund**

- **As Is** (a proposal recommended for funding as proposed)
- **In Part** (a proposal for which partial funding is recommended for selected project phases or components)
- **With Conditions** (a proposal for which funds are recommended if the applicant contractually agrees to meet the specified conditions)

**Consider as Directed Action in Annual Workplan** (a proposal addressing a high priority action that requires some revision followed by additional review prior to being recommended for funding)
**Not Recommended** (a proposal not currently recommended for funding-after revision may be considered in the future)

**Note on "Amount":**

For proposals recommended as Fund As Is, Fund In Part or Fund With Conditions, the dollar amount is the amount recommended by the Selection Panel.

For proposals recommended as Consider as Directed Action in Annual Workplan, the dollar amount is the amount requested by the applicant(s).

| **Fund** | |
|---|---|
| **As Is** | **-** |
| **In Part** | **-** |
| **With Conditions** | **-** |
| **Consider as Directed Action** | **-** |
| **Not Recommended** | **X** |

Amount: **$0**

Conditions, if any, of approval (if there are no conditions, please put "None"):

**None.**

Provide a brief explanation of your rating:

**Technically, this is a weak proposal as indicated by the Technical Panels adequate rating, and all of the six External Science reviewers good ratings. The regional panel gave a low rating. Concerns include: proposed project would not produce a mechanistic understanding of the problem or practical solutions, very little on mass-balancing BOD, oversimplification of algal physiology in the approach, just three waterways provides limited power for addressing the SJR drainage, performance measures could have been better defined, and costs were difficult to understand. There was no apparent major strategic benefit although SJR low DO is an important problem for the ERP.**

# Research and Restoration Technical Panel Review:

**CALFED Bay-Delta 2002 ERP PSP**
**Research and Restoration Technical Panel Review Form**

**Proposal Number:** 225

**Applicant Organization:** US DOE, Berkeley National Laboratory

**Proposal Title:** Understanding and Characterizing Sources of Biological Oxygen Demand in West-Side Tributaries of the San Joaquin River

**Review:**

**Please provide an overall evaluation summary rating:**

**Superior: outstanding in all respects;**
**Above Average: Quality proposal, medium or high regional value, and no significant administrative concerns;**
**Adequate: No serious deficiencies, no significant regional impediments, and no significant administrative concerns;**
**Not Recommended: Serious deficiencies, significant regional impediments or significant administrative concerns.**

| **Overall Evaluation Summary Rating** | **Provide a brief explanation of your summary rating** |
|---|---|
| -Superior | **The authors propose research that would provide information to help better understand the sources of BOD in the San Joaquin River. The low DO problem in the San Joaquin is well documented and warrants the attention of the CALFED Bay Delta Ecosystem Restoration Program, but this proposal would neither provide a mechanistic understanding of the problem nor practical solution. Hence, the proposed work does not warrant funding from the CALFED Program in its present form. The review panel thought that the authors should consider expanding Task #1 (i.e. comparison of BOD sources between contrasting catchments) to include multiple catchments.** |
| -Above average | |
| **X**Adequate | |
| -Not recommended | |

1. **Goals and Justification.** Does the proposal present a clear statement of goals, objectives and hypotheses? Does the proposal present a clear justification and conceptual model for the project?

   **The authors propose three goals: 1) characterization of BOD sources in two sloughs that drain catchments with different land-use, 2) investigate the control and occurrence of algal growth in the San Luis Drain, and 3) develop real-time BOD monitoring tools. These goals are clearly stated and timely and important due to the massive oxygen deficit that occurs annually in the San Joaquin River. The San Joaquin River at the Stockton Deep Water Channel has experienced a long record of annual hypoxia events that threaten critical fish populations and create major water quality concerns. The hypoxia problem is well documented, but its causes are only qualitatively understood. The hypoxia problem is severe and can have Delta wide feedbacks, and certainly warrants the immediate and sustained attention of the CALFED Bay Delta Ecosystem Restoration Program**

2. **Likelihood of Success (Approach, Feasibility, Capabilities and Performance Measures).** Is the project likely to succeed based on the approach, feasibility and project team capabilities? Are the proposed performance measures adequate for measuring the project's success?

   **Parts of the approach are well designed and some novel information and methodology may be generated. The approach would be much stronger if multiple sloughs and tributaries were examined in terms of BOD load and sources. The paired comparison has limited power when discussing the San Joaquin's drainage. The "spot-sampling" is of limited value and will generate qualitative data at best. Objective #1 is certainly feasible and success is likely, and objective #2 (although more difficult) may be likely. The reviewers had serious doubts about the success of objective #3.**

   **CAPABILITIES: Solid backgrounds. Yes, capable of executing the proposed work.**

3. **Outcomes and Products.** Will the project advance the state of scientific knowledge in general and/or make an important contribution to the state of knowledge of the Bay-Delta Watershed? For restoration proposals, is the project likely to contribute to ecosystem restoration or species recoveries in a significant way? Will the project produce products useful to decision-makers and scientists?

   **The project specific performance measures are not presented in sufficient detail. This is important for this project since they propose three objectives that have increasing level of difficulty.**

   **Insufficient detail is provided to evaluate. The reviewers thought that interpretive outcomes are unlikely and direct-support of CALFED management decisions would be limited.**

4. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   **The project as proposed is extremely expensive considering the scope of the proposed work and limited benefits to the CALFED Restoration Program**

5. **Regional Review.** How did the regional panel(s) rank the proposal (High, Medium, Low)? Did the regional panel(s) identify significant benefits (regional priorities, linkages with other activities, local involvement) or impediments (local constraints, conflicts with other activities, lack of local involvement) to this proposal? What were they?

   **LOW-MED -- feasibility concerns**

6. **Administrative Review.** Were there significant concerns about the proposal with regard to the prior performance, environmental compliance and budget administrative reviews? What were they?

   **Budget review states that total funds requested appear to be for 1 year of project costs, however, it does not equal the year 1 budget table costs nor the total for 3 years of project costs.**

**Miscellaneous comments:**

**None**

## San Joaquin Regional Review:

**Proposal Number:** 225

**Applicant Organization:** US DOE, Berkeley National Laboratory

**Proposal Title:** Understanding and Characterizing Sources of Biological Oxygen Demand in West-Side Tributaries of the San Joaquin River

Overall Ranking: **X**Low **-**Medium **-**High

Provide a brief summary explanation of the committee's ranking:

**Questionable there would be success at some components. Little has been done in San Joaquin to date compared to Sacramento. More basic reconnaisance needed in San J first, beofre major effort.**

1. Is the project feasible based on local constraints?

   **X**Yes **-**No

   How?

   **Questionable there would be success at evaluating impact of toxicity on in situ community. Multiple overlapping and covarying stressors will make this very difficult**

2. Does the project pursue the restoration priorities applicable to the region as outlined in the PSP?

   **X**Yes **-**No

   How?

   **Yes, but not San Joaquin specific: most of the problems have been identified in Sacramento. MR-5**

3. Is the project adequately linked with other restoration activities in the region, such as ongoing implementation projects and regional planning efforts?

   **X**Yes **-**No

   How?

   **Builds on several prior CALFED projects**

4. Does the project adequately involve local people and institutions?

   **-**Yes **X**No

How?

**Proposal focusses on Sacramento examples only. Vague about San Joaquin.**

Other Comments:

**We recognize need for this work, but need to start more modestly, and when problem is well documented, then proceed with more ambitious program.**

# External Scientific: #1

**Research and Restoration External Scientific Review Form**

Proposal Number: **225**

Applicant Organization: **US DOE, Berkeley National Laboratory**

Proposal Title: **Understanding and Characterizing Sources of Biological Oxygen Demand in West-Side Tributaries of the San Joaquin River**

**Conflict of Interest Statements:**
I have no financial interest in this proposal.
**X**Correct
**-**Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

**None**

**Review:**

**Please provide an overall evaluation summary rating:**

**Excellent: outstanding in all respects;**
**Good: quality but some deficiencies;**
**Poor: serious deficiencies.**

| **Overall Evaluation Summary Rating** | **Provide a brief explanation of your summary rating** |
|---|---|
| **X**Excellent | **I give this proposal and excellent rating only if Task 3 is omitted. The first 2 Tasks are well defined, highly pertinent to CALFED, and experimentally achievable. Task 3 is highly germane to CALFED but nebulous in design and implementation. If Task 3 is retained, I give this a good rating.** |
| **-**Good | |
| **-**Poor | |

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   **The goals are clearly stated as tasks: Task 1 is to characterize the sources of BOD in Mud and Salt Sloughs, Task 2 is to determine the contribution of algae growing in the drain to BOD, and Task 3 is to develop real-time BOD monitoring technology.**

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

**This is a well justified proposal as it addresses topics directly germane to CALFED restoration activities. The tasks are justified individually: Task 1 as relevant to TMDL development; Task 2 as pertinent to results of prior studies and data; Task 3 as being important in management of the ecosystem.**

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   **The Task 1 approach is well designed and achievable.**

   **The research approach for Task 2 is appropriate if not a little overblown. Synoptic surveys of phytoplankton biomass in the drains should not be difficult to complete. The drain is essentially a chemostat and I like the idea of Eularian sampling along with Lagrangian.**

   **To me, the Task 3 approach is a little fuzzy. I get the feeling that the PIs do not have a good handle on the technology of real-time monitoring of algae and nutrients. There are a lot of different types of probes; all of which have different detection limits and interferences. I expected them to know ahead of time what instruments would be used and to give a justification as to why they were selected.**

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   **Task 1: The PIs have much experience in this kind of research so the success level is probably high.**

   **Task 2: The approach is technically feasible and has a high likelihood of success.**

   **Task 3: The approach is technically feasible but has a low likelihood of success. See above discussion in APPROACH**

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   **Performance measures should be better defined. Saying only that this is research and will be reported in the literature is not enough. However, none of the other scientific proposals I read had much to say about this topic.**

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   **Monitoring sources of BOD from different areas over time series will be very useful for watershed management. The data will be crucial for developing load allocations as well. Task 2 products are embedded in BOD results but should be separated out . However, it is easy to see how knowing algal growth contribution to BOD effluent might also be useful. No mention of Task 3 products.**

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   **The PIs are all highly qualified and have put together an impressive field and research team.**

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   **Budget is high but there is a lot of field work in this project. Significant savings could be made by deleting Task 3 (if recommended by other reviews as well).**

**Miscellaneous comments:**

**PIs list Alex Horne as a potential reviewer. He is presently on another CALFED proposal with Stringfellow and Quinn. I see this as a conflict.**

# External Scientific: #2

**Research and Restoration External Scientific Review Form**

Proposal Number: **225**

Applicant Organization: **US DOE, Berkeley National Laboratory**

Proposal Title: **Understanding and Characterizing Sources of Biological Oxygen Demand in West-Side Tributaries of the San Joaquin River**

**Conflict of Interest Statements:**
I have no financial interest in this proposal.
**X**Correct
**-**Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

**none**

**Review:**

**Please provide an overall evaluation summary rating:**

**<u>Excellent:</u> outstanding in all respects;**
**<u>Good:</u> quality but some deficiencies;**
**<u>Poor:</u> serious deficiencies.**

| **Overall Evaluation Summary Rating** | **Provide a brief explanation of your summary rating** |
|---|---|
| **-**Excellent | **As is probably clear by now, the project may achieve many of its objectives but I'm worried about what big picture conclusions will be possible.** |
| **X**Good | |
| **-**Poor | |

1. **<u>Goals.</u>** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   **The goals of the proposed research are clearly stated and are likely to be attained. The weakness lies in the real-world relevance and applicability to novel situations (see below).**

2. **<u>Justification.</u>** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

**I have two major concerns. As far as I can tell there will not be a way to put the results of this project in context of other BOD sources. Knowing the load from these sloughs will not necessarily quantify their contribution to anoxic events in the DWSC. How large are other allochthonous sources, in situ phytoplankton growth, how rapid is reaeration? I appreciate that a single project can not deal with the whole problem but the PIs do not even discuss how they would decide whether a BOD of some value would be large or small in the final analysis. Secondly, sampling two sloughs will not separate agricultural versus wetland contributions although their "spot sampling" will help. A more rigorous separation of these potential sources would be replicated over both space and time. I can easily foresee novel mixtures of wetlands, agriculture (and other sources of BOD) distributed across the landscape that would yield net contributions to the SJR different from this single pairwise comparison.**

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   **The likelihood of reaching their objectives seems reasonably high, but the objectives are not particularly difficult and again I wonder about their applicability.**

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   **The in situ monitoring of BOD is novel and I'd guess they will find some correlation given the number of predictor variables they propose to include. The more difficult issue is determining whether a given BOD load actually influences the likelihood of anoxia in the DWSC.**

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   **Yes**

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   **They will describe the fluctuations in BOD at the sampling sites and may be able to suggest some causative factors driving differences in BOD.**

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   **The PIs are capable and have the experience and equipment necessary.**

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   **I may not understand how the budget is laid out but Item 17 says they are requesting a total of 398,602 for a 3 year project while the budget detail shows 398333 for year 1 alone. Given what they will accomplish 150k per year seems reasonable, over 300k per year does not.**

**Miscellaneous comments:**

# External Scientific: #3

**Research and Restoration External Scientific Review Form**

Proposal Number: **225**

Applicant Organization: **US DOE, Berkeley National Laboratory**

Proposal Title: **Understanding and Characterizing Sources of Biological Oxygen Demand in West-Side Tributaries of the San Joaquin River**

**Conflict of Interest Statements:**
I have no financial interest in this proposal.
**X**Correct
**-**Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

**none**

**Review:**

**Please provide an overall evaluation summary rating:**

**Excellent: outstanding in all respects;**
**Good: quality but some deficiencies;**
**Poor: serious deficiencies.**

| **Overall Evaluation Summary Rating** | **Provide a brief explanation of your summary rating** |
|---|---|
| **-**Excellent | **This project is designed to evaluate the differences between wetland and agriculturally-derived BOD. The PIs present a three phase approach at achieving those goals. I suggest that the PIs broaden task 1 to provide numerous contrasts of ag and wetland types, hydrology and slope. The third task of remote sensors was not well developed and could be dropped due to the lack of specificity of collection and interpretation.** |
| **X**Good | |
| **-**Poor | |

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   **The PIs present a detailed project designed to differentiate BOD loading from contrasting types of land cover in the San Joaquin valley wetlands and agricultural zones. They propose to study the development of algal blooms and finally, to develop a sensor method for unattended monitoring of BOD. They present their goals and hypotheses in a clear manner. The issue of BOD loading to the Bay-Delta area is a pertinent research angle and one that directly affects the health of the ecosystem.**

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

   **Relative to the existing knowledge presented in the proposal the PIs show the need for this study. Much of the cited literature on current BOD research, however appears to be that of this research group or related investigators to this study. The authors make a case for their type of study and focus their research on sites within the river system.**

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   **The approach appears a little unusual for the stated goals. I do feel that it is quite important to delineate the effects of agriculture vs. wetland BOD, but the PIs appear to really narrow their focus, especially in the study of algal development in the San Luis Drain. It would appear to be a better approach to compare and contract many different types of wetlands, and agricultural tracts with contrasting soil type, slope and organic matter content. The more that can be made of predictive powers of a solid set of data from contrasting land uses might be better for management concerns.**

   **I was somewhat interested to see what the authors had in mind for sensors in Task 3, but was somewhat disappointed. There was no real conceptual model on how the commercially-available probes would be used and how the data collected would be translated. There just didnt seem to be much of an effort in designing this section.**

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   **As presented, the proposed work is probably technically feasible. There is a high likelihood of success in describing the processes at the limited study sites. The applicability to the entire basin though, might be somewhat limited.**

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   **As in other academic proposals, the performance measures are given as progress reports and publications. It would have been better to integrate the goals of the research into overall project performance measures. What level of QA will be deemed as a goal?**

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   **I am not confident that the level of sampling and the limited number of sites will produce the product of information (the Steering Committee) have requested concerning sources and loads of BOD in this watershed. There just simply arent a stratified number of sites to determine the overall loads. It will be difficult to interpret the results to the complicated nature of the contrasting land use/land cover characteristics of the watershed.**

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   **The PIs have the experience to proceed with this research project. They appear to have the infrastructure to pull off their intended goals of the project. The sensor development certainly needs a little more thought before implementation.**

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   **This is a very expensive project directed solely at a topic such as BOD. The panel will have to decide if this level of support is warranted versus other pressing contaminant concerns in the Bay-Delta region.**

**Miscellaneous comments:**

# External Scientific: #4

**Research and Restoration External Scientific Review Form**

Proposal Number: **225**

Applicant Organization: **US DOE, Berkeley National Laboratory**

Proposal Title: **Understanding and Characterizing Sources of Biological Oxygen Demand in West-Side Tributaries of the San Joaquin River**

**Conflict of Interest Statements:**
I have no financial interest in this proposal.
**X**Correct
**-**Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

**none**

**Review:**

**Please provide an overall evaluation summary rating:**

**<u>Excellent:</u> outstanding in all respects;**
**<u>Good:</u> quality but some deficiencies;**
**<u>Poor:</u> serious deficiencies.**

| **Overall Evaluation Summary Rating** | **Provide a brief explanation of your summary rating** |
|---|---|
| **-**Excellent | **The authors would advance the knowledge of BOD tranpsort from two very important land-uses, wetlands and ag fields. Their goals however are a little disparate and a mechanistic understanding would not be achieved.** |
| **X**Good | |
| **-**Poor | |

1. **<u>Goals.</u>** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   **I have written a review which I have appended into the Misc. section. see below for detailed review.**

2. **<u>Justification.</u>** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

**see below**

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   **See below for review of approach.**

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   **The scale is not consistent with the objectives, see below for explanation.**

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   **Yes.**

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   **The instrument array could be very valuable for future work.**

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   **Capable.**

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   **The cost is high for a the possible returns.**

**Miscellaneous comments:**

**Review, Understanding and characterizing sources of biological oxygen demand in west-side tributaries of the San Joaquin River Stringfellow and Quinn.**

**Low oxygen, hypoxic, or anoxic waters create habitat that is not optimal for the growth and livelihood of aquatic animals. Although they do occur naturally, many low oxygen dead zones are the result of anthropogenic activities and can dramatically alter the structure and function of a water body. The creation of low oxygen waters is often attributed to organic matter and nutrient delivery from land, but is usually the result of a complex system of feedbacks between this transport, biology and physics of a given water body. Stringfellow and Quinn propose a monitoring program that will determine the relative sources of BOD to the San Joaquin River. They will also determine the limiting nutrient to algal growth in an agriculture drain and look into real-time monitoring of BOD through instrument arrays. I think that some of the research outlined by Stringfellow and Quinn would be valuable, but on a whole the proposed work is fairly basic and too narrowly focused. I would give it a 3 ranking on a 1 to 5 scale.**

**The proposal often discusses determining the sources of BOD to the San Joaquin (Task 1, pg 5). It appears the only two sources to be researched are agriculture vs. wetland. There are many different forms of organic matter (i.e., BOD) draining even these two systems, practices on land that can produce BOD and contribute to BOD load, and modes of transportation of BOD to streams/rivers (i.e., groundwater, surface flow). This research would provide no mechanistic understanding of these important variables. Based on the outlined problem a more comprehensive experimental approach is justified that would better map out the uncertainty and drivers to managers.**

**The algal growth in the agricultural drain may indeed by a problem, and should be researched further. I think they are oversimplified the physiology of algal growth, and am not sure how valuable their approach would be. I would guess that concentrations of the limiting nutrients (i.e., nitrogen, phosphorus, and micro-nutrients) are fairly high (no values given). Managing the input of these nutrients is difficult, particularly if you do not yet know the source (which I would argue would be a more appropriate first order approach). Furthermore, you could drop the nutrient input in half through management, and still have significant quantities of BOD created through algal growth. You could also determine the phosphorus was limiting your growth in the drain, manage phosphorus inputs to the drain (a non-trivial task) and witness a shift in phytoplankton species to a species that is more tolerant at low phosphorus concentrations; with an end-result being no change in exported biomass. What appears to be going on is that the San Luis Drain, acts as a sediment trap (Table 2, TSS drops an order of magnitude from inlet to outlet). The trapping of sediments releases phytoplankton from light limitation, this coupled with warm water temps leads to high growth rates. A more appropriate management of this problem may be to lower light levels (by screening or capping) and/or temperature. Experiments designed to determine the best way to manage algal growth in these drains should try and incorporate the affects of light and temperature (in addition to nutrients) on algal growth, probably through micro or mesocosm work. It would also be an error to ignore phytoplankton species if you decided to investigate the control of algal growth in these drains (Task 2).**

**The authors propose a suite of instruments to monitor BOD. Such a suite of instruments would be very useful. I do wonder if they are putting the horse in front of the cart though. That is, managing the BOD laod from various tributaries on a real time basis (pg 6) seems unrealistic at this point. The reality of designing, upkeep, and analyzing the usefulness of a suite of instrument is a difficult task. These instruments need a lot of quality control and there use is not a trivial task. Even if the goal was achieved, a suite of instruments to monitor BOD, it seems as though the first order task should be to achieve a more thorough understandings of the mechanisms controlling BOD transport, the sources of BOD, and low oxygen water production before you try and monitor and regulate it.**

**There is very little information towards how they will mass balance BOD loads.**

# External Scientific: #5

**Research and Restoration External Scientific Review Form**

Proposal Number: **225**

Applicant Organization: **US DOE, Berkeley National Laboratory**

Proposal Title: **Understanding and Characterizing Sources of Biological Oxygen Demand in West-Side Tributaries of the San Joaquin River**

**Conflict of Interest Statements:**
I have no financial interest in this proposal.
**X**Correct
**-**Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

**none**

**Review:**

**Please provide an overall evaluation summary rating:**

**Excellent: outstanding in all respects;**
**Good: quality but some deficiencies;**
**Poor: serious deficiencies.**

| **Overall Evaluation Summary Rating** | **Provide a brief explanation of your summary rating** |
|---|---|
| **-**Excellent | **The authors propose research that would provide information to help better understand the sources of BOD in the San Joaquin River. The low DO problem in the San Joaquin is well documented and warrants the attention of the CALFED Bay Delta Ecosystem Restoration Program, but this proposal would neither provide a mechanistic understanding of the problem nor practical solution. Hence, the proposed work does not warrant funding from the CALFED Program in its present form.** |
| **X**Good | |
| **-**Poor | |

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   **The authors propose three goals: 1) characterization of BOD sources in two sloughs that drain catchments with different land-use, 2) investigate the control and occurence of algal growth in the San Luis Drain, and 3) develop real-time BOD monitoring tools. These goals are clearly stated and timely and important due to the massive oxygen deficit that occurs annually in the San Joaquin River.**

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

   **The San Joaquin River at the Stockton Deep Water Channel has experienced a long record of annnual hypoxia events that threaten critical fish populations and creat major water quality concerns. The hypoxia problem is well documented, but its causes are only qualitatively understood. The hypoxia problem is severe and can have Delta wide feedbacks, and certainly warrants the immediate and sustained attention of the CALFED Bay Delta Ecosystem Restoration Program**

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   **Parts of the approach are well designed and some novel information and methodology may be generated. I think the approach would be much stronger if multiple sloughs and tributaries were examined in terms of BOD load and sources. The paired comparison has limited power when discussing the San Joaquin's drainage. The "spot-sampling" is of limited value and will generate qualitative data at best.**

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   **Objective #1 is certainly feasible and success is likely, and objective #2 (although more difficult) may be likely. I have serious doubts about the success of objective #3.**

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   **The project specific performance measures are not presented in sufficient detail. This is important for this project since they propose three objectives that have inceasing level of difficulty.**

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   **Insufficient detail is provided to evaluate. In my assessment, interpretive outcomes are unlikely and direct-support of CALFED management decisions would be limited.**

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   **Solid backgrounds. Yes, capable of executing the proposed work.**

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   **extremely expensive considering the scope of the proposed work and limited benefits to the CALFED Restoration Program**

**Miscellaneous comments:**

**There are several proposals that deal with aspects of the low DO in the Stockton Deep Water Channel and there seems to be connected threads with authors. It is difficult to adequately evaluate the value of an individual proposal without seeing the pool of previously funded and proposed projects together. I recommend that CALFED convene a group to deal with this integration issue, otherwise fragmented research projects are unlikely to lead to a solution.**

# External Scientific: #6

**Research and Restoration External Scientific Review Form**

Proposal Number: **225**

Applicant Organization: **US DOE, Berkeley National Laboratory**

Proposal Title: **Understanding and Characterizing Sources of Biological Oxygen Demand in West-Side Tributaries of the San Joaquin River**

**Conflict of Interest Statements:**
I have no financial interest in this proposal.
**X**Correct
**-**Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

**none**

**Review:**

**Please provide an overall evaluation summary rating:**

**Excellent: outstanding in all respects;**
**Good: quality but some deficiencies;**
**Poor: serious deficiencies.**

| **Overall Evaluation Summary Rating** | **Provide a brief explanation of your summary rating** |
|---|---|
| **-**Excellent | **The proposed study is excellent for providing evaluation and management suggestions concerning local direct BOD sources in Salt and Mud Slough watersheds. The study includes development of instrumentation for real-time BOD measurements, which may find broad use. However, this project is not designed to determine if activities in the Grasslands area influence oxygen conditions in SDWSC, as claimed in the Executive Summary of the proposal.** |
| **X**Good | |
| **-**Poor | |

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   **The proposed study has three clearly defined objectives: 1) to characterize the sources of BOD in the Salt and Mud Slough tributaries; 2) to investigate the occurrence and control of algal growth in agricultural drainage as an approach to minimizing BOD load; and 3) to develop BOD monitoring technology for the real-time management of oxygen demanding substances. Formulated hypotheses are well defined and are testable by the proposed research. However, the study is not designed to reach the overall goal: to provide recommendations on how to reduce oxygen deficit in the Stockton Deep Water Ship Channel (SDWSC).**

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

   **The proposal provides a clear justification for the study in terms of monitoring and control of local BOD sources in the Salt and Mud Sloughs watersheds. However, it does not give a good assessment of the potential impact on the oxygen deficit in SDWSC, which is the ultimate goal.**

   **Salt and Mud Sloughs might be important contributors of BOD to SJR. However, as applicants acknowledge, a reliable mass balance model for BOD in the San Joaquin River (SJR) is absent. (Is it underway?) Therefore it is unclear how effective the BOD-reducing measures in the Salt and Mud Sloughs can be on the oxygen conditions in SDWSC. I made this simple calculation: I took the preliminary BOD load data for the Salt Slough at Highway 165 and the Mud Slough at site B from Table 2 (sum equal to 12,726 lbs/day) and divided it by the usual SJR discharge during summer (ca 50 m3 s-1). This resulted in 1.3 mg/L BOD, which is a potentially substantial, but clearly not the dominant cause of the oxygen deficit. Most probably, this is a significant overestimate of the direct impact on oxygen conditions in SDWSC, since it unrealistically assumes no input of oxygen to the water column for the entire 100-mile SJR stretch from the study area to the SDWSC.**

   **Since BOD production (in the form of algal growth) is substantial in the main channel of SJR as well as in SDWSC, it may be expected that tributaries like Mud and Salt Sloughs have a strong indirect impact on the oxygen deficit in SDWSC. For example, tributaries may enhance or suppress algal growth in SJR by providing limiting nutrients or shading materials (suspended solids and colored dissolved organic matter). Thus, management of the system based only on direct BOD discharge to SJR, as suggested in the proposal, would be seriuosly flawed.**

   **I assume that the results from Tasks 1 and 2 can be applicable on a broader scale than the Salt and Mud Sloughs. However, it is not discussed in the proposal, how these two tributaries are representative of the remaining SJR watershed. It is also not discussed if the proposed development of methodology for real-time BOD monitoring (Task 3) can be useful in other parts of the SJR watershed.**

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   **In general, the proposed study design is well suited for the three objectives. Acquired results are likely to provide important information about BOD sources in Salt and Mud Sloughs, which might be used in management by decision-makers. In addition, the proposed development of new methodology for real-time BOD monitoring may encourage real-time BOD management practices in the SJR watershed.**

   **I could not adequately assess the sampling strategy for the Task #1, since the map of the study area in Figure 1 was unreadable due to the low resolution.**

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

**The study approach is well documented and feasible. The scale of the project is consistent with the three objectives.**

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   **Performance measures seem to be adequate for the project.**

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   **The project is likely to produce useful recommendations and technologies for BOD management in the SJR watershed. The close contacts between the applicants and the SJR watershed managers promises that these products will be used in practice. However, the outcome of this project will not provide the basis necessary to implement the total maximum daily load allocations in the region, as claimed in the proposal. For that, a reliable BOD mass balance model is needed for the entire SJR watershed.**

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   **Applicants seem to be well qualified and sufficiently equipped for the proposed work.**

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   **The proposed budget is adequate.**

**Miscellaneous comments:**

## Environmental Compliance:

**Proposal Number:** 225

**Applicant Organization:** US DOE, Berkeley National Laboratory

**Proposal Title:** Understanding and Characterizing Sources of Biological Oxygen Demand in West-Side Tributaries of the San Joaquin River

1. Are the legal or regulatory issues that affect the proposal identified adequately in the proposal?

   **X**Yes **-**No

   If no, please explain:

2. Does the project's timeline and budget reflect adequate planning to address legal and regulatory issues that affect the proposal?

   **X**Yes **-**No

   If no, please explain:

3. Do the legal and regulatory issues that affect the proposal significantly impair the project's feasibility?

   **-**Yes **X**No

   If yes, please explain:

Other Comments:

## Budget:

**Proposal Number:** 225

**Applicant Organization:** US DOE, Berkeley National Laboratory

**Proposal Title:** Understanding and Characterizing Sources of Biological Oxygen Demand in West-Side Tributaries of the San Joaquin River

1. Does the proposal include a detailed budget for each year of requested support?

   **X**Yes **-**No

   If no, please explain:

   **Atachment D provides detail.**

2. Does the proposal include a detailed budget for each task identified?

   **X**Yes **-**No

   If no, please explain:

3. Does the proposal clearly state the type of expenses encompassed in indirect rates or overhead costs?

   **X**Yes **-**No

   If no, please explain:

4. Are appropriate project management costs clearly identified?

   **X**Yes **-**No

   If no, please explain:

5. Do the total funds requested (Form I, Question 17A) equal the combined total annual costs in the budget summary?

   **-**Yes **X**No

   If no, please explain (for example, are costs to be reimbursed by cost share funds included in the budget summary).

   **Q. 17A amount appears to be for 1 year of project costs, however, it does not equal the year 1 budget table costs nor the total for 3 years of project costs.**

6. Does the budget justification adequately explain major expenses?

   **X**Yes **-**No

   If no, please explain:

7. Are there other budget issues that warrant consideration?

   **-**Yes **X**No

   If yes, please explain:

Other Comments: